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## ***In vitro* evaluation of botanicals against Anthracnose of chilli caused by *Colletotrichum capsici* Butler and Bisby**

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Investigation on anthracnose (*Colletotrichum capsici* Butler and Bisby) of chilli under north Karnataka conditions was carried out in the Plant Pathology laboratory, Department of Plant Pathology, College of Agriculture, Dharwad. Agricultural University, Dharwad to find out suitable management strategies. Due to hazardous effect of chemical fungicides, search for safer alternative to control the pathogen is better choice. This led to trials on the use of botanicals to control the pathogen. The botanicals such as Bellary Jali (*Prosopis juliflora*), Tridax (*Tridax procumbens*), Neem (*Azadirachta indica*), Honge (*Pongamia glabra*), Congress weed (*Parthenium hysterophorus*), Adathoda (*Adathoda vesica*), Tulsi (*Ocimum sanctum*), Periwinkle (*Vinca rosea*), Lucky (*Vitex negundo*) were evaluated by poison food technique at two different concentrations. Among the nine botanicals tested at two concentration (5 and 10 %), *Ocimum sanctum* followed by *Adathoda vesica* found to be effective among the overall tested botanicals and gave cent per cent mycelial inhibition of *Colletotrichum capsici* at all the concentration.

**Key words:** Chilli, *Capsicum annum*, botanicals, *Colletotrichum capsici*, disease management

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### **INTRODUCTION**

Chilli, (*Capsicum annum* L.) cultivation has existed for several hundred years as a sustainable form of agriculture in India and in many other countries. It is an annual herbaceous spice/vegetable/cash crop grown in both tropical and sub-tropical regions. It is an essential ingredient of our Indian cuisine because of its pungency, colour, flavour and aroma. As a condiment it has become indispensable in every Indian home. It is grown for its pungent fruits which are used both as green and ripe to impart pungency and flavour to the food. Chilli suffers from many diseases caused by fungi, bacteria, viruses, nematodes and also by abiotic stresses. Among the fungal diseases damping off, anthracnose or

fruit rot, powdery mildew and leaf spots are the most prevalent ones. The anthracnose or ripe fruit rot caused by *Colletotrichum capsici* Butler and Bisby is a wide spread problem limiting the profitable cultivation and seed production throughout the major chilli growing regions of India. The disease has been reported for the first time in India by Sydow in 1913 from Coimbatore of Madras Presidency. Choudhury (1957) has reported that the disease is recorded from Assam wherever chilli is grown resulting in a loss of 12-30 per cent of the fruits. Bansal and Grover (1969) during their studies on *Capsicum frutescens* L. have reported that crop losses due to anthracnose disease ranges from 10-35 per cent in 1966 and 20-60 per cent during 1967 in six districts of Punjab and Haryana. Thind and Jhooty (1985) have reported that losses due to anthracnose of chilli varied between 66-84 per cent.

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## MATERIALS AND METHODS

Fresh healthy plant parts of 100 g (leaves/root/bulb/rhizome) as indicated below (Table 1) were collected from field, washed with distilled water and air dried and crushed in 100 ml of sterile water. The crushed product was tied in muslin cloth and the filtrate was collected. The prepared solution gave 100 per cent, which was further diluted to required concentrations of 5 and 10 per cent. The extracts *C. capsici* on the PDA using poisoned food technique under *in vitro* condition as described below. The per cent inhibition of growth of the test fungus was calculated by using the formula of Vincent (1947).

**Table 1 :** List of plant extracts used under *in vitro* condition are mentioned below

Common name	Scientific name	Plant part used
Bellary Jali	<i>Prosopis juliflora</i>	Leaf
Tridax	<i>Tridax procumbens</i>	Leaf
Neem	<i>Azadirachta indica</i> Juss	Leaf
Honge	<i>Pongamia glabra</i>	Leaf
Congress weed	<i>Parthenium hysterophorus</i>	Leaf
Adathoda	<i>Adathoda vesica</i>	Leaf
Tulsi	<i>Ocimum sanctum</i> L.	Leaf
Periwinkle	<i>Vinca rosea</i> L.	Leaf
Lucky	<i>Vitex negundo</i>	Leaf

### Poisoned food technique

The poisoned food technique (Nene and Thapliyal, 1973) was followed to evaluate the efficacy botanicals in inhibiting the mycelial growth of *C. capsici*. The fungus was grown on PDA medium for 14 days prior to setting up the experiment. The PDA medium was prepared and melted. Extract was added to the melted medium to obtain the required concentrations. Twenty ml of poisoned medium was poured in each sterilized Petriplates. Suitable check was maintained without addition of plant extract. Mycelial disc of 5 mm was taken from the periph-

ery of 14 days old colony and was placed in the center of Petriplates. Plate incubated at  $27 \pm 1^\circ\text{C}$  for 14 days and five replications were maintained for each treatment. The diameter of the colony was measured in two directions and average was recorded. Per cent inhibition of mycelial growth of the fungus was calculated by using the formula by Vincent (1947).

$$I = \frac{(C-T)}{C} \times 100$$

where

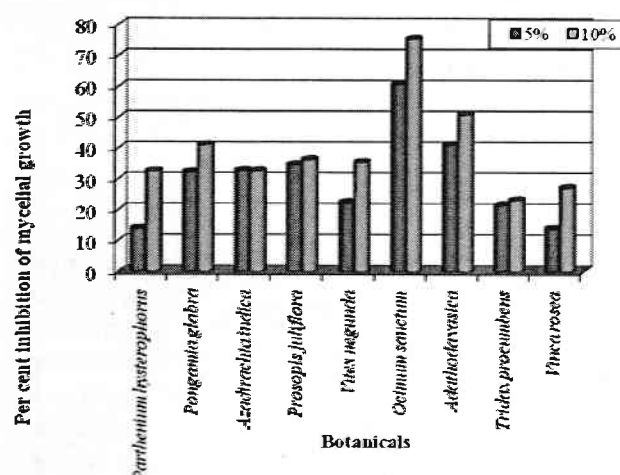
I = Per cent inhibition

C = Radial growth in control

T = Radial growth in treatment

## RESULTS AND DISCUSSION

In the present investigation nine botanicals were evaluated under *in vitro* condition against *C. capsici* to know the fungitoxic nature of their extracts. and presented in Table 2 and Figs.1 and 2. Though complete inhibition of the pathogen was not observed in any of the botanicals tested but considerable amount of inhibition was noticed in some of them. Among the nine plant extracts tested against *C. capsici*, *Ocimum sanctum* at both the concentration 5 (60.92 %) and 10 per cent (75.44 %) were significantly superior over all other plant extracts followed by *Adathoda vesica* at 5 (41.12%) and 10



**Fig. 1 :** *In vitro* evaluation of botanicals against *Colletotrichum capsici*

per cent (50.84%) respectively. Least growth was observed in case of *Parthenium hysterophorus* (14.00 %) at 5 per cent concentration (Table 1). In the present investigation, the mycelial growth of fungus was inhibited to greater extent by tulsi leaf extract, which is said to have pesticides property

**Table 2 :** *In vitro* evaluation botanicals against *Colletotrichum capsici*

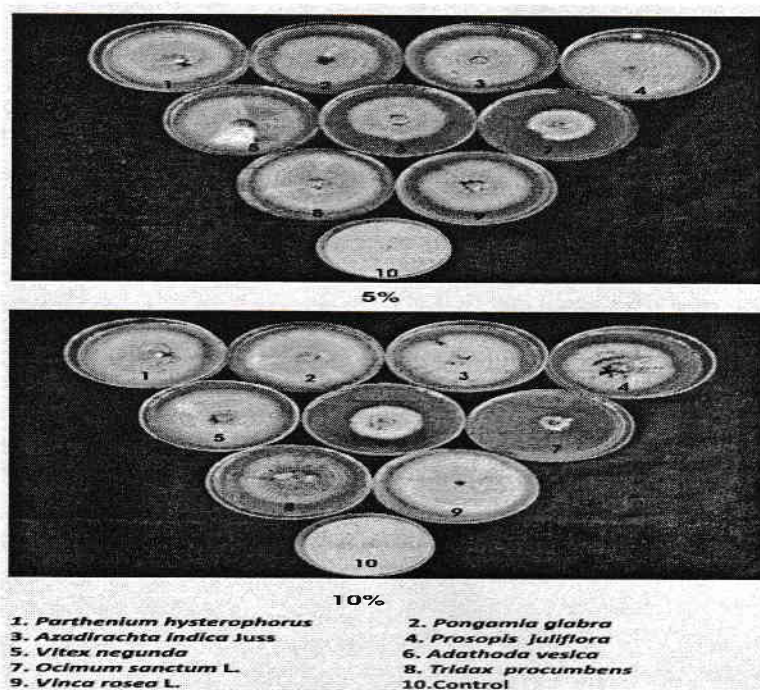
Botanicals	Per cent inhibition of mycelial growth		
	Concentrations		
	5%	10%	Mean
<i>Parthenium hysterophorus</i>	14.00 (21.98)*	32.58 (34.82)*	23.29 (28.40)*
<i>Pongamia glabra</i>	32.34 (34.34)	41.18 (39.94)	36.76 (37.30)
<i>Azadirachta indica</i>	32.84 (34.97)	32.71 (34.90)	32.77 (34.93)
<i>Prosopis juliflora</i>	34.73 (36.11)	36.40 (37.13)	35.62 (36.62)
<i>Vitex negundo</i>	22.49 (28.32)	35.44 (36.55)	28.96 (32.43)
<i>Ocimum sanctum</i>	60.92 (51.33)	75.44 (60.32)	68.18 (55.82)
<i>Adathoda vasica</i>	41.12 (40.28)	50.84 (45.56)	45.98 (42.89)
<i>Tridax procumbens</i>	21.53 (27.20)	23.13 (28.76)	22.33 (27.98)
<i>Vinca rosea</i>	14.01 (21.99)	27.20 (31.44)	20.60 (26.71)
Mean	30.44 (32.98)	39.43 (38.81)	—
	S.Em±		<b>CD @ 1%</b>
Botanicals	0.20		<b>0.80</b>
Concentration	0.09		<b>0.37</b>
BxC	0.28		<b>1.10</b>

\* Arcsine transformed values

followed by adathoda. Present investigations are in agreement with Shivapuri *et al.* (1997) who noticed that among the plant extracts evaluated against *C. capsici*, *Azadirachta indica*, *Datura stramonium*, *Ocimum sanctum*, *Polyanthia longifolia* and *Vinca rosea* were more fungitoxic. Plant products have been tested in many laboratories. Seed and spray treatment showed that the crude extract from rhizome, leaves and creeping branches of sweetflag (*Acorus calamus*), palmorosa (*Cymbopogon martinii*) oil, *Ocimum sanctum* leaf extract, and neem (*Azadirachta indica*) oil could restrict growth of the anthracnose fungus (Jeyalakshmi and Seetharaman, 1998; Korpraditskul *et al.*, 1999).

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**Fig. 2 :** *In vitro* evaluation of different botanicals against mycelial growth of *Colletotrichum capsici* the causal agent of anthracnose of chilli.

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